ATTACHMENT II-9
CONSTRUCTION QA/QC MANUAL

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INTRODUCTION

Envirocare operates a Landfill Disposal Facility at Clive, Utah in Section 32 of T1S, R11W, SLB&M. The landfill facility is used for the disposal of Mixed-Waste (hazardous and radioactive waste). The facility is located approximately 80 miles west of Salt Lake City and 4 miles south of Interstate-80 near the Clive exit.

Envirocare of Utah, Inc. has developed this Construction Quality Assurance/Quality Control (CQA/QC) Manual to ensure that construction activities comply with the applicable state and federal regulations, approved design criteria, engineering plans and specifications, and good engineering practice. The attached construction project plan addresses the control and verification activities by describing the Engineering Specifications, and the Quality Assurance (QA) and Quality Control (QC) inspections, sampling, testing, survey controls, and records required to demonstrate that Envirocare has met these requirements. This CQA/QC Manual is contained in the State-issued RCRA Part B Permit as Attachment II-9.

Quality Assurance includes overseeing the construction quality control activities to ensure the implementation of the CQA/QC Manual requirements and sound construction practices. Quality Control provides a means to control the quality of the construction operations to predetermined standards and requirements through inspections, testing, and construction observations. The CQA/QC Manual shall be the permit document that governs compliance in construction of the Phase III Mixed Waste Landfill Project. The DER includes the quality assurance review, construction process evaluation, and key engineering specifications for each work element. The DER forms the basis for the CQA/QC Manual and shall be a general guidance document to control the construction process.

The professional work and good judgment of each employee, supplemented by strong management commitment and resources, is essential to maintaining the expected high construction quality. This quality expectation is inspired and implemented at every level within Envirocare of Utah, Inc. This CQA/QC Manual for Envirocare of Utah, Inc. has the full support and involvement of all levels of management. All employees shall adhere to its provisions and are encouraged to report all issues of non-conformance or of unsafe conditions affecting quality.

The process of continuous quality improvement leads to the development of a better and more responsive quality system. Lessons learned from assessments and audits and from operating experiences should be used to augment or enhance Envirocare's quality systems. Employees are empowered to perform to the best of their abilities and encouraged to identify process improvement opportunities, identify problems, and to offer solutions to those problems. Envirocare management seeks continuous quality improvement at every level and encourages and supports the overall Envirocare quality improvement goal of exceeding the expectations of our customers whenever possible.

1.0 ORGANIZATION, RESPONSIBILITY AND AUTHORITY

1.1 Envirocare of Utah, Inc. is both the owner and operator of its South Clive, Utah Landfill Disposal Facility. Envirocare recognizes that ultimate responsibility for the design, construction, operation, and closure of the facility rests with Envirocare alone. Envirocare has the authority to delegate to others, such as contractors, agents, or consultants, the work of establishing and executing parts of the CQA/QC Manual, but retains ultimate responsibility. The organization structure for the CQA program is illustrated on the organization chart in Figure 7.1 of the Design Engineering Report (DER).

1.2 The Construction QA/QC organization within Envirocare, includes the following personnel:

President of Envirocare
Executive Vice President
Senior Vice-President of Compliance and Development
Vice President of Operations
Corporate Quality Assurance Manager
Corporate Engineering Manager
Construction Quality Assurance Engineer
Construction Quality Assurance Officer
Construction Engineer
Materials Testing Contractor
External Quality Assurance Auditor

The President of Envirocare or Senior Vice-President of Compliance and Development shall designate the names of employees and others that will perform the job functions of Corporate Quality Assurance Manager (CQAM), Construction Quality Assurance Officer (CQAO), and External Quality Assurance Auditor, as described in this Manual. The Executive Vice President or Vice President of Operations shall designate the names of employees that will perform the job functions of Corporate Engineering Manager, and Construction Engineer. The Utah Division of Solid and Hazardous Waste (DSHW) shall be notified of changes in personnel performing these job functions within three days after their effective date in filling the position.

Construction QA and QC activities are carried out by the QA group and the QC group. The QC group answers directly to the Corporate Engineering Manager, via the Construction Engineer. The Construction Engineer shall manage the QC group for Mixed Waste landfill construction. Both groups are staffed by Envirocare employees or contractors hired by Envirocare; hereinafter referred to as employees.

1.2.1 President of Envirocare

The President of Envirocare is ultimately responsible for the successful construction and operation of the Envirocare facilities at South Clive, Utah. He has the authority to select and dismiss organizations or individuals charged with the design, construction, operations, quality assurance, and quality control activities.

1.2.2 Executive Vice President

The Executive Vice President is responsible to the President of Envirocare for the successful construction of Envirocare's landfills and facilities.

1.2.3 Senior Vice-President of Compliance and Development

The Senior Vice-President of Compliance and Development is responsible to the President of Envirocare for the effective implementation of the Quality Assurance program. The Senior Vice President of Compliance and Development supervises the Corporate Quality Assurance Manager. He has the authority to select and dismiss organizations or individuals charged with quality assuranced activities.

1.2.4 Vice President of Operations

The Vice President of Operations is responsible to the Executive Vice President for the successful construction of Envirocare's landfills and facilities. The Vice President of Operations supervises the Corporate Engineering Manager. He has the authority to select and dismiss organizations or individuals charged with design, construction, and quality control activities.

1.2.5 Corporate QA Manager (CQAM)

The Corporate Quality Assurance Manager (CQAM) reports to the Senior Vice-President of Compliance and Development and supervises the CQAO, the Construction Quality Assurance Engineer, the Document Control Manager, and Quality Assurance personnel. The CQAM is responsible for ensuring that the quality assurance requirements outlined in the Construction Quality Assurance Manual are implemented. The reporting relationships allow the CQAM sufficient authority and autonomy to: implement and direct the Quality Assurance Program (QAP); identify quality problems and verify implementation of solutions independent of undue influences and responsibilities, such as costs and schedules. The CQAM shall have direct contact (as needed) with the President of Envirocare for implementing the QAP.

The CQAM coordinates implementation of the CQA/QC Manual with the Construction Engineer. The CQAM has the authority to stop any aspect of the work that is not in compliance with the CQA/QC Manual. After work has been stopped by the CQAM, corrective action(s) shall be determined by the Corporate Engineering Manager and approved by the CQAM. Corrective actions must be undertaken to correct any defective work. The specific responsibilities of the CQAM include:

a. ensuring that the CQA/QC Manual shall be implemented and a satisfactory level of quality shall be maintained in construction QC activities;

b. training QA staff and the Construction Quality Assurance Engineer on QA

requirements and procedures;

c. scheduling, coordinating, and ensuring timely completion of QA assessment activities with the construction QC Group;

d. verifying that construction QC personnel are properly completing and documenting all on-site observations and tests required to ensure compliance with the CQA/QC Manual;

e. perform the following during the course of construction and following completion of the project the CQAM, or designee, shall:

1) maintain a project QA file for maintaining and storing the originals or copies of originals of all data sheets, certification records, and reports that are generated in carrying out the CQA/QC Manual;

2) document on a weekly basis to the Senior Vice-President of Compliance and Development, a review and evaluation of notations of any non-conforming and/or suspected non-conforming work. The evaluation shall show the degree of reconciliation of any non-conforming work with the construction design/specifications and the CQA/QC Manual. Also, the CQAM shall provide a copy of the weekly review and evaluation and any required supporting documentation to the DSHW by Thursday of the following week. This report can be submitted by facsimile;

3) the CQAM shall assist in preparing the QA portion of the Construction Certification Report at the completion of the project;

f. the CQAM shall provide complete and sufficient documentation of any and all QA actions, in the Mixed Waste Construction QA files;

g. ensure that any changes in approved drawings and specifications follow the change control procedures described herein and that, when appropriate, approval from the cognizant regulatory agency has been obtained prior to the implementation of the change.

1.2.4 Corporate Engineering Manager

The Corporate Engineering Manager reports to the Vice President of Operations and supervises the Construction Engineer for the successful design and construction of Envirocare's landfills and facilities. The Corporate Engineering Manager is responsible for the management of facility design; including landfill construction, engineering support, including site structural engineering, soil mechanics and materials. Reviews and approves, with QA oversight, those designs and specifications. Initiates and provides design solutions to non-conformance or quality problems encountered during construction. The Corporate Engineering Manager has the

authority to make minor changes in accordance with Section 3.0 in the CQA/QC Manual and the DER. The Corporate Engineering Manager shall be a Utah Registered Professional Engineer.

The Corporate Engineering Manager has been assigned the specific responsibility of overseeing the overall construction of the project. The Corporate Engineering Manager shall oversee completion of the Construction Certification Report and the As-Built Drawings. The Corporate Engineering Manager is responsible for designing the landfills and facilities to meet the operational requirements of the owner and the regulatory requirements of appropriate agencies and approving subsequent changes.

1.2.5 Construction Quality Assurance Engineer

The Construction Quality Assurance Engineer (CQAE) shall work under the direction of the CQAM to ensure that the CQA/QC Manual is executed properly, that all observation and testing activities are satisfactorily fulfilled, and to evaluate the effectiveness of the controls identified in the CQA/QC Manual. This evaluation includes field observations, performing quality assurance testing and sampling, reviewing documentation prepared by the QC group, accepting or rejecting the quality of work performed, and documenting and reporting the results of QC evaluations.

The authority of the CQAE shall be limited to the performance, observation and documentation of requirements of the CQA/QC Manual. The CQAE shall not have the authority to modify in any way the design of the facility or the requirements of the CQA/QC Manual. The CQAE has the authority to stop work that is not in compliance with applicable regulations or requirements and as directed by the CQAM. After work has been stopped by the CQAE, work can only resume upon the documented approval of the corrective action by the CQAM.

1.2.6 Construction QA Officer (CQAO)

The CQAO reports to the CQAM and has direct contact with the Senior Vice-President of Compliance and Licensing. The CQAO is responsible for ensuring that the construction quality assurance requirements outlined in the CQA Manual relating to cell construction are implemented. The CQAO works closely with the Quality Assurance Engineer, Construction Engineer and CQAM to ensure that construction specifications are met and documented. The CQAO shall be a Utah Registered Professional Engineer. Envirocare may contract with an independent P.E. to perform QAO certifications.

1.2.7 Construction Engineer

The Corporate Engineering Manager has assigned the Construction Engineer specific responsibility for overseeing production, scheduling, and coordination activities associated with construction of the waste landfills. The Construction Engineer shall report directly to the Corporate Engineering Manager. During construction, the Construction Engineer shall regularly inspect the construction site.

The Construction Engineer shall review proposed design, engineering, or construction changes and submit these changes to the Corporate Engineering Manager for approval, as appropriate, in accordance with Section 3.0 of this CQA/QC Manual.

1.2.7.1 Mixed Waste Landfill Construction Responsibilities

During Mixed Waste Landfill construction activities, the Construction Engineer shall implement and direct the QC portions of this Manual; identify quality control problems; initiate, recommend, or provide quality control solutions. In the extended absence of the Construction Engineer, the Corporate Engineering Manager shall delegate the duties of the Construction Engineer.

The Construction Engineer has the authority to stop any aspect of the work that is not in compliance with the CQA/QC Manual and the DER. After work has been stopped by the Construction Engineer, work can only be resumed with the documented approval of the corrective action by the Corporate Engineering Manager and the CQAM. Ensure that corrective actions required by the CQAM are completed.

1.2.8 Materials Testing Contractor (MTC)

A Materials Testing Contractor (MTC) may be contracted to perform QC testing. The MTC shall provide trained and qualified personnel who are approved to perform all required tests. MTC personnel shall report directly to the Construction Engineer. Envirocare retains ultimate responsibility for ensuring that all materials are placed in accordance with the schedule, approved testing methods, and this Manual.

Synthetic layers QC shall be performed by the Synthetics Contractor's personnel.

1.2.9 External Quality Assurance Auditor

An External Quality Assurance Auditor shall be contracted to audit the construction activities. The individual or group that is to perform this audit shall be independent of the Envirocare organization. The auditor shall: a) audit at least 15% of the Mixed Waste landfill documentation; and b) observations of field actions that occur while the auditor is on-site. This audit shall occur during and after landfill construction. A copy of the auditors report shall be submitted to the CQAM, and DSHW. For the DSHW, this report shall be included in the Construction Certification Report.

2.0 INSPECTION ACTIVITIES

This section describes the inspection activities (observations and tests) that shall be performed by the QA and Construction QC personnel during construction and installation of the work elements associated with the project. The major work elements that comprise the project, the specifications governing each work element, the QC activities to be performed to ensure a quality outcome of each work element, and the QA activities to be performed to determine and ensure the effectiveness of the construction QC activities are identified in Table 1 of the CQA/QC Manual. Table 1 also identifies the frequency of observations and tests, the acceptance/rejection criteria that shall be used in the evaluation of the tests, and how the observations and tests are to be recorded and documented.

Measuring and testing equipment are to be calibrated at least annually or as per the manufacturer's recommended calibration frequency or the standard frequency practiced in the engineering profession. The highest frequency of the above mentioned frequencies shall be required. At the beginning of each project, the construction QC Group shall provide the CQAE with the calibration documentation . This documentation shall be included in the QA project files.

3.0 CHANGE CONTROL PROCEDURES

3.1 The need may arise for a design, engineering, or construction change to the project. Therefore, change control procedures have been established to ensure the design analysis remains valid upon incorporation of the change. Where a significant design change is necessary because of an incorrect or faulty design, the design process and verification procedures themselves should be reviewed and modified, as necessary.

Phased construction activities, drawings and prints which are approved for a particular construction phase must be stamped by a Utah Registered Professional Engineer as a " Permit Drawing" and must be submitted to the DSHW. Any subsequent changes are considered field changes.

3.2 The general change control procedure is as follows:

a. A change request may be initiated by any one of the several individuals, including but not limited to, the contractor, CQAM, CQAO, Construction Engineer, Corporate Engineering Manager, and representatives of the DSHW.

b. All proposed design, engineering, or construction changes must be reviewed for applicability by the Construction Engineer. After consultation with the Corporate Engineering Manager (a Utah Registered Professional Engineer)) as well as other personnel (CQAM, contractor, etc.), and if determined to be justified by the Construction Engineer, the scope of the change shall be subject to the same design control measures as those applied to the original design.

c. The Construction Engineer submits the change for approval to the Corporate Engineering Manager, or to a qualified individual designated by the Corporate

Engineering Manager, who works under the direct supervision of the Corporate Engineering Manager. The Corporate Engineering Manager or designee determines if the changes are: 1) minor changes which do not require formal approval from the DSHW; or, 2) major changes which require formal approval from the DSHW. Minor and major changes are described as follows:

1) Minor changes are construction implementation changes that do not affect the intent or scope of the design. Examples of minor changes include changes required to make pieces fit together (e.g., changes to panel layout for HDPE liner deployment); changes to a construction process. Minor changes may be implemented immediately and shall be documented as outlined in items d, e, and f in this section and the DSHW shall be notified of the change.

2) Major changes are defined as all changes which are not minor changes. Major changes must be reviewed by the same Envirocare approval authority which granted the original design approval. Envirocare shall then submit the major change to the DSHW for approval, prior to any part of the change being implemented. The DSHW shall determine whether verbal or written verification is required.

   If verbal approval is granted, the time, date, and agency contact for the approval, shall be documented in the "Daily Construction Report". A copy of the documented approval shall be provided to the DSHW and the CQAM. Verbally approved changes can be implemented immediately.

   If written verification is required, the approval must be issued by the DSHW prior to Envirocare implementing the change. The DSHW may grant permission to incorporate the changes while the approval letter from the agency is prepared. If permission is granted to proceed, the time, date, and agency contact for granting the permission is recorded in the "Daily Construction Report". A copy of the documented permission shall be provided to the DSHW.

d. Upon approval, the Construction Engineer shall issue an amendment to the applicable documents and submit the amendment to the Document Control Officer for distribution to all document holders. Alternatively, for minor changes, the Construction Engineer shall red-line the change onto all field copies of the applicable drawing or print. Each red-line change must note the date, time and initials of the individual enacting the change adjacent to the change on the drawing or print.

e. Documentation of all changes shall be included in the Construction Certification Report.

f. As-built drawings of the project shall reflect all changes made to the Permit Drawings.

4.0 DOCUMENTATION

4.1 Documentation of construction and inspection activities associated with the CQA/QC Manual shall consist of construction QA/QC forms, as-built drawings, a Construction Certification Report. All records shall be indexed, identifiable, retrievable and controlled in an established document control system. All construction and testing documentation produced and received by Envirocare for the project shall become a part of the permanent construction record. This includes, but is not limited to, log books, field notes, transcription records, etc. The original documents shall be retained on-site as part of the Mixed Waste operating record with duplicates retained at corporate headquarters.

Drawings and prints which are approved for a particular phase of construction must be stamped by a Utah Registered Professional Engineer as " Permit Drawing". Drawings or prints not stamped by a Utah Registered Professional Engineer shall not be used for construction unless specifically approved by the DSHW.

4.2 Records may be corrected or updated when a change is accomplished or reviewed and approved by the originator or by the department manager or supervisor, as indicated on the organizational chart.

Records are corrected by:

a. lining out the original entry;
b. entering the correction immediately adjacent to the original entry;
c. having the individual making the correction initial and date the line-out; obtaining approval initials and dates from the original signatory for the changes; and
d. all dates are to be the actual dates of the review action being performed.

Records are updated by:

a. incorporating the additional data;
b. having the individual incorporating the data initial and date the data adjacent to entry; and
c. obtaining approval initials and dates from the original signatory for the changes.

Any changes made to the original document subsequent to QC and/or QA review must be reviewed and approved by the QC and/or QA reviewer. The reviewer shall indicate approval of the changes by documenting the review on the appropriate Daily report.

4.3 "White Out" is specifically prohibited from being used to make corrections. Record entries shall not be made by pencil, erasable ink, or any other means of non-permanent marking. When complete, records on pre-printed forms with unused or blank spaces shall be noted to indicate that no further entries to that individual form or record are needed.

4.4 Access to the Envirocare construction records is limited to those Envirocare employees, excluding outside auditors and regulators, who have a specific need for information therein or as

authorized by the Senior Vice-President of Compliance and Development.

4.5 Construction QA/QC Forms

Documentation requirements associated with CQA/QC activities are described in Table 1 of the project plan. The level of detail provided on each individual form shall be sufficient to demonstrate all work elements were conducted in accordance with the requirements described in Table 1 of the project plan. Any non-conforming or suspected non-conforming work and corrective actions to be taken shall also be documented.

Each form shall be signed and dated by the individual completing the form. The signature date shall be the date in which the form was reviewed and approved. A sample of the forms, to record the results of observations and testing, are included in Appendix C of the DER. These forms are provided to identify the minimum documentation required; insomuch as the revision does not adversely affect the quality control or quality assurance aspects or overall content of the individual form, the revision shall be considered a minor or incidental change.

4.5.1 Documentation Review

The results of testing and observations, recorded on the forms, which meet prescribed specifications shall be reviewed for completeness, adequacy and correctness. Acceptance of the forms shall be documented by the Construction Engineer and/or CQAM in the appropriate Daily Report. The results of testing and observations which are out of specifications shall be reviewed for acceptance by the Corporate Engineering Manager. This documentation review shall be representative of the work element and shall be distributed throughout the duration of construction activities for each work element.

During construction, the Construction Engineer is responsible for maintaining and storing copies of all construction QC forms and reports that are generated in carrying out the QC requirements of the CQA/QC Manual. The CQAM is responsible for maintaining and storing copies of all QA forms and reports that are generated in carrying out the QA requirements of the CQA/QC Manual.

4.5.2 Documentation Approval

Primary control of compliance is the responsibility of Envirocare. Envirocare shall observe, inspect, and test each lift or work element during active construction. The active construction process is not complete until the approval of each lift or work element is given by the appropriate Envirocare field inspection. With the field approval of each lift or work element, Envirocare is documenting compliance with the CQA/QC Manual requirement. If at any time after initial field approval has been granted, Envirocare self-identifies any non-conforming work the following corrective action will be followed. Upon identification of non-conforming work, Envirocare has the option of repairing, reworking, rejecting, or using the non-conforming work as is. If the work is repaired, reworked, or rejected then the non-conforming work will be considered to be in active construction once again. If Envirocare exercises the option of using the non-conforming work as is then a technical justification supporting using the non-conforming work as is will be developed.

The DSHW is encouraged to inspect the Phase III landfill project at any time, however, deficiencies found during active construction of a lift or work element, prior to field approval, may not constitute a violation of the CQA/QC Manual requirements. The approval process has been presented in a flow chart form to show all review and approval steps required from construction through the As-Built approval (See DER Figure 5.4, Approval Flow Chart During Construction)

4.7 As-Built Drawings

At the completion of construction, as-built drawings shall be prepared from the red-lined drawings. The as-built drawings shall incorporate all changes as outlined in the change control procedures in Section 3.0 of this manual. The as-built drawings shall include the key survey data of the landfill construction, as described in the DER (Section 4.4).

The as-built drawings shall be submitted to the DSHW within 60 days of completion of construction. The completion of construction is defined as the date of the approval final inspection. The final inspection shall be performed within 60-days of construction completion. A copy of this notification shall be submitted to the DSHW. This notification may be transmitted by facsimile. Depending on the scope of the project, and with the concurrence of the DSHW, the as-built drawings may be submitted at the conclusion of the entire project.

4.8 Construction Certification Report

At the completion of each construction project, a Construction Certification Report shall be prepared under the direction of the Corporate Engineering Manager. The Corporate Engineering Manager shall approve this report and the construction shall be certified as having been performed in accordance with the approved drawings, plans, and specifications. This report shall be submitted to the DSHW within 60 days of completion of each phase of construction. Depending on the scope of the project, and with the concurrence of the DSHW, this Construction Certification Report may be submitted at the conclusion of the entire project. This report shall include, as a minimum, the following items:

a. a narrative of the work performed by work element;
b. a summary of all changes, presented in matrix form, which includes the following:
   - the number of the change;
   - a description of the change;
   - the type of change (e.g. to make things fit, to meet a code, substitution of equivalent materials, or a major change approved by DSHW; and
   - any comments to clarify or explain the change.

4.8.1 Construction QA Review

At the completion of construction, a construction QA review shall be prepared under the direction of the CQAO. The CQAO shall approve this review and the required CQA/QC testing and inspections shall be certified as having been performed in accordance with the approved CQA/QC plans, and specifications. This review shall be included in the Construction Certification Report. This review shall include, as a minimum, the following items:

a. a copy of the QA sampling and testing schedule;
b. narrative of the testing and inspections performed;
c. a summary of all non-conforming work with the corrective actions taken or planned;
d. a copy of the results of all testing and inspections performed for the project; and
e. An External QA Audit.